

1126-35-324

**Michael Jenkinson\*** (jenkim2@rpi.edu) and **Michael I Weinstein**. *On-Site and Off-Site Bound States of the Discrete Nonlinear Schroedinger Equation and The Peierls-Nabarro Barrier*.

We construct several families of symmetric localized standing waves (breathers) to the one-, two-, and three-dimensional discrete nonlinear Schroedinger equation (DNLS) with cubic nonlinearity using bifurcation methods about the continuum limit. Such waves and their energy differences play a role in the propagation of localized states of DNLS across the lattice. The energy differences, which we prove to be exponentially small in a natural parameter, are related to the Peierls-Nabarro Barrier in discrete systems, first investigated by M. Peyrard and M.D. Kruskal (1984). These results may be generalized to different lattice geometries and inter-site coupling parameters. Finally, we discuss the local stability properties of these bound states. This is joint work with Michael I. Weinstein. (Received January 17, 2017)